Document details

Back to results | 1 of 1

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Search for dark matter produced in association with a Higgs boson decaying to γγ or τ + τ − at √ s = 13 TeV (Article) (Open Access)

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Abstract

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A search for dark matter particles is performed by looking for events with large transverse momentum imbalance and a recoiling Higgs boson decaying to either a pair of photons or a pair of τ leptons. The search is based on proton - proton collision data at a center - of - mass energy of 13 TeV collected at the CERN LHC in 2016 and corresponding to an integrated luminosity of 35.9 fb − 1. No significant excess over the expected standard model background is observed. Upper limits at 95% confidence level are presented for the product of the production cross section and branching fraction in the context of two benchmark simplified models. For the Z′ - two - Higgs - doublet model (where Z′ is a new massive boson mediator) with an intermediate heavy pseudoscalar particle of mass m A = 300 GeV and m_{DM} = 100 GeV, the Z′ masses from 550 GeV to 1265 GeV are excluded. For a baryonic Z′ model, with m_{DM} = 1 GeV, Z′ masses up to 615 GeV are excluded. Results are also presented for the spin - independent cross section for the dark matter - nucleon interaction as a function of the mass of the dark matter particle. This is the first search for dark matter particles produced in association with a Higgs boson decaying to two τ leptons.[Figure not available: see fulltext.]. © 2018, The Author(s).

SciVal Topic Prominence

Topic: jets | production | parton shower

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Funding details

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